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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,741	04/02/2004	Mohamed K. Nezami	064750.0475	1388

45507 7590 11/06/2007

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EXAMINER	
SINGH, HIRDEPAL	
ART UNIT	**PAPER NUMBER**
2611	

NOTIFICATION DATE	DELIVERY MODE
11/06/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOmail3@bakerbotts.com
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Office Action Summary	Application No.	Applicant(s)	
	10/816,741	NEZAMI, MOHAMED K.	
	Examiner	Art Unit	
	Hirdepal Singh	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 October 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the amendment filed on October 15, 2007. The response to the Applicant's arguments and the rejection is as below.

Specification

2. The Amendment corrected the informalities in the specification therefore the objection is withdrawn.

Response to Arguments

3. Applicant's arguments filed October 15, 2007 have been fully considered but they are not persuasive.

4. Applicant argues, "...the *Carleton-Padovani* combination proposed by the Examiner fails to disclose, teach, or suggest the following recited in independent Claim 1: receiving a signal at an offset estimator, the signal conveying a plurality of symbols in a plurality of packets, a packet having a preamble comprising plurality of preamble symbols; zero-padding the received signal in a time domain of the received signal with a plurality of zero-valued samples to yield a zero-padded signal, the number of the zero-valued samples related to the number of a plurality of Fourier transform bins and the number of the preamble symbols."

5. Examiner's response: The cited reference(s) Carleton and Padovani et al disclose all the limitations in the amended claims. Carleton discloses, receiving a signal at an offset estimator (abstract, lines 3-6; column 7, lines 1-12), the signal conveying a plurality of symbols in a plurality of packets, and Padovani discloses a system and method for high rate data transmission where received data comprise plurality of packets and a packet having a preamble comprising plurality of preamble symbols (paragraphs 0046, 0076), and Padovani further discloses, zero-padding the received signal in a time domain of the received signal with a plurality of zero-valued samples to yield a zero-padded signal (figures 4e, 4f, 4g; paragraph 0124), the number of the zero-valued samples related to the number of a plurality of Fourier transform bins and the number of the preamble symbols (paragraph 0126) and the signal is then Fast Fourier Transformed to obtain the increased sampling rate in frequency domain as taught by Carleton, another advantage of zero padding is to reduce the resulting Fast Fourier Transform bin width. As clear from the above discussion the combination of the cited references teaches all the limitations. Therefore, the rejection based on these references still holds.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-4, 7, 8, 10-13, 16, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carleton (US 6,757,344) in view of Padovani et al. (US 2003/0063583).

Regarding Claims 1, 10 and 19:

Carleton discloses a system and method for determining frequency offset estimates (figure 2; abstract) comprising;

receiving a signal at an offset estimator, the signal conveying a plurality of symbols (abstract; column 7, lines 1-12);

taking a Fourier transform of the zero-padded signal using the Fourier transform bins to yield a transformed signal (206, 218 in figure 2; column 1, lines 60-67; column 2, lines 44-48; column 5, lines 12-25; column 6, lines 27-34);

establishing a maximum power of the transformed signal (4-2 in figure 4; column 6, lines 30-34, and 58-63; column 7, lines 42-58); and

generating a frequency offset estimate based on the maximum power of the transformed signal (column 6, lines 26-34; column 8, lines 32-41).

Carleton discloses all the subject matter as described above, except for specifically teaching that the received signal has symbols in a plurality of packets, a packet having a preamble comprising plurality of preamble symbols; and zero-padding the received signal in a time domain of the received signal with a plurality of zero-valued samples to yield a zero-padded signal, the number of the zero-valued samples related

to the number of a plurality of Fourier transform bins and the number of the preamble symbols.

However, Padovani in the same field of endeavor discloses a system and method for high rate data transmission where received data comprise plurality of packets and a packet having a preamble comprising plurality of preamble symbols (paragraphs 0046, 0076), and Padovani further discloses, zero-padding the received signal in a time domain of the received signal with a plurality of zero-valued samples to yield a zero-padded signal (figures 4e, 4f, 4g; paragraph 0124), the number of the zero-valued samples related to the number of a plurality of Fourier transform bins and the number of the preamble symbols (paragraph 0126).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to zero-padding the signal in time domain as taught by Padovani in Carleton system for better performance as the signal is then Fast Fourier Transformed in order to obtain the increased sampling rate in frequency domain, another advantage of zero padding is to reduce the resulting Fast Fourier Transform bin width.

Regarding Claims 2 and 11:

Carleton further discloses generating the frequency offset estimate based on the maximum power of the transformed signal by generating the frequency offset estimate as being substantially equivalent to the maximum power of the transformed signal (column 6, lines 28-34 determining the offset estimate based on greatest power of subsamples is interpreted as the estimate is substantially equivalent to maximum

power).

Regarding Claims 3 and 12:

Carleton discloses all the subject matter as described above except for specifically teaching converting the received signal to a baseband frequency using the preamble, the preamble comprising less than ten percent of the packet.

Padovani in the same field of endeavor teaches that the preamble of the signal comprises less than ten percent (3.1 percent) of the data packet (paragraph 0121).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the short preamble in the signal in order to reduce the interference and at the same time keeping the probability of false acquisition at a minimum level.

Regarding Claims 4 and 13:

Carleton further discloses establishing maximum power of the transformed signal further comprises locating a Fourier transform bin corresponding to the maximum power (4-2 in figure 4; column 6, lines 27-34; greatest maximum power of the subsamples of sub-carriers is interpreted as max. power of FFT bin).

Regarding Claims 7 and 16:

Carleton further discloses adjusting the received signal in accordance with at least one of the frequency offset estimate, a phase offset estimate, and a residual error

estimate (abstract; column 4, lines 5-10; the frequency offset compensator adjust the signal for frequency offset).

Regarding Claims 8 and 17:

Carleton discloses all the subject matter as described above and, further discloses adjusting the received signal in accordance with at least one of the frequency offset estimate, a phase offset estimate, and a residual error estimate (abstract; column 4, lines 5-10; the frequency offset compensator adjust the signal for frequency offset), and decoding/detecting the corrected signal to yield the plurality of symbols (208 in figure 2; recovered signal is interpreted to be the decoded output symbols).

8. Claims 5, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carleton (US 6,757,344) in view of Padovani et al. (US 2003/0063583) as applied to claims 1 and 10 above, and further in view of Becker et al. (US 6,218,896).

Regarding Claims 5 and 14:

Carleton discloses all the subject matter as described above and, further discloses establishing maximum power of the transformed signal comprising locating a Fourier transform bin corresponding to the maximum power as above, but doesn't explicitly disclose determining a phase offset estimate from a fast Fourier transform bin corresponding to the maximum power.

However, Becker in the same field of endeavor discloses phase offset estimate

from a fast Fourier transform bin or chirp z-transform corresponding to the maximum power (330-334 in figure 3; column 1, lines 15-20, 42-52; column 2, lines 7-12).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to determine the phase offset estimate from a fft bin corresponding to maximum power in order to correct the offset in the in the received signal.

9. Claims 6, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carleton (US 6,757,344) in view of Padovani et al. (US 2003/0063583) as applied to claims 1, and 10 above, and further in view of Miet (US 6,499,008).

Regarding Claims 6 and 15:

Carleton discloses all the subject matter as described above except for explicitly teaching generating a decoded signal from the received signal, comparing the received signal with the decoded signal, and determining a residual error estimate in accordance with the comparison.

Miet in the same field of endeavor, teaches producing a decoded signal, comparing the decoded signal with original signal i.e. received signal to get residual error (column 2, lines 15-23).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to compare the received signal with decoded signal to

get the residual error estimate in order to make the offset estimate and to correct the error.

10. Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carleton (US 6,757,344) in view of Padovani et al. (US 2003/0063583) as applied to claims 1, and 10 above, and further in view of Sachse et al. (US 2004/0086070).

Regarding Claims 9 and 18:

Carleton discloses all the subject matter as described above except that the apparatus comprising a numerically controlled oscillator to receive, the frequency offset estimate, a phase offset estimate, a residual error correction, and adjust the received signal in accordance with the frequency offset estimate, the phase offset estimate, and the residual error correction.

Sachse in the same field of endeavor, teaches correcting the signal according to frequency offset and phase offset (paragraph 0019), and further discloses a numerically controlled oscillator among different modules where the modules receives from FEC i.e. frequency error corrector or PEC i.e. phase error corrector or both (paragraph 0055; 340 in figures 3-4).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the received signal according to the frequency offset estimate, a phase offset estimate, and a residual error estimate by

using a NCO i.e. numerically controlled oscillator in order to get advantage of the digital properties and to synthesize a wide range of precise frequency ratios.

11. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Carleton (US 6,757,344) in view of Padovani et al. (US 2003/0063583), in view of Becker et al. (US 6,218,896), in view of Miet (US 6,499,008), and further in view of Sachse et al. (US 2004/0086070).

Regarding Claim 20:

Carleton discloses a system and method for determining frequency offset estimates (figure 2; abstract) comprising;

receiving a signal at an offset estimator, the signal conveying a plurality of symbols (abstract; column 7, lines 1-12);

taking a Fourier transform of the zero-padded signal to yield a transformed signal (206, 218 in figure 2; column 1, lines 60-67; column 2, lines 44-48);

establishing a maximum power of the transformed signal (4-2 in figure 4; column 6, lines 30-34, and 58-63; column 7, lines 42-58), further discloses establishing maximum power of the transformed signal further comprises locating a Fourier transform bin corresponding to the maximum power (4-2 in figure 4; column 6, lines 27-34; greatest maximum power of the subsamples of sub-carriers is interpreted as max. power of fft bin);

generating a frequency offset estimate based on the maximum power of the transformed signal (column 6, lines 26-34; column 8, lines 32-41);

adjusting the received signal in accordance with at least one of the frequency offset estimate, a phase offset estimate, and a residual error estimate (abstract; column 4, lines 5-10; the frequency offset compensator adjust the signal according to frequency offset), and decoding/detecting the corrected signal to yield the plurality of symbols (208 in figure 2; recovered signal is interpreted to be the decoded output symbols).

Carleton discloses all the subject matter as described above, except for specifically teaching zero-padding the received signal in a time domain of the received signal with plurality of zero padded signals to yield a zero-padded signal the number of the zero-valued samples related to the number of a plurality of Fourier transform bins and the number of the preamble symbols; converting the received signal to a baseband frequency using a preamble of a packet of the received signal, the preamble comprising less than ten percent of the packet; generating a decoded signal from the received signal to comparing the received signal with the decoded signal, determining a residual error estimate in accordance with the comparison, a numerically controlled oscillator to receive the frequency offset estimate, a phase offset estimate, a residual error correction, and adjust the received signal in accordance with the frequency offset estimate, the phase offset estimate, and the residual error correction, and determining a phase offset estimate from a fast Fourier transform bin corresponding to the maximum power.

Padovani in the same field of endeavor discloses a system and method for high rate data transmission where received data comprise plurality of packets and a packet having a preamble comprising plurality of preamble symbols (paragraphs 0046, 0076), and Padovani further discloses, zero-padding the received signal in a time domain of the received signal with a plurality of zero-valued samples to yield a zero-padded signal (figures 4e, 4f, 4g; paragraph 0124), the number of the zero-valued samples related to the number of a plurality of Fourier transform bins and the number of the preamble symbols (paragraph 0126) and that the preamble of the signal comprises less than ten percent (3.1 percent) of the data packet (paragraph 0121).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to zero-padding the signal in time domain as taught by Padovani in Carleton system for better performance as the signal is then Fast Fourier Transformed in order to obtain the increased sampling rate in frequency domain, another advantage of zero padding is to reduce the resulting Fast Fourier Transform bin width, and to use the short preamble in the signal in order to reduce the interference and at the same time keeping the probability of false acquisition at a minimum level.

Miet in the same field of endeavor teaches producing a decoded signal, comparing the decoded signal with original signal i.e. received signal to get residual error (column 2, lines 15-23).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to compare the received signal with decoded signal to

get the residual error estimate in order to make the offset estimate and to correct the error.

Sachse in the same field of endeavor, teaches correcting the signal according to frequency offset and phase offset (paragraph 0019), and further discloses a numerically controlled oscillator among different modules where the modules receives from FEC i.e. frequency error corrector or PEC i.e. phase error corrector or both (paragraph 0055; 340 in figures 3-4).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the received signal according to the frequency offset estimate, a phase offset estimate, and a residual error estimate by using a NCO i.e. numerically controlled oscillator in order to get advantage of the digital properties and to synthesize a wide range of precise frequency ratios.

Becker in the same field of endeavor discloses phase offset estimate from a fast Fourier transform bin or chirp z-transform corresponding to the maximum power (330-334 in figure 3; column 1, lines 15-20, 42-52; column 2, lines 7-12).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to determine the phase offset estimate from a fft bin corresponding to maximum power in order to correct the offset in the in the received signal.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hirdepal Singh whose telephone number is 571-270-1688. The examiner can normally be reached on Mon-Fri (Alternate Friday Off)8:00AM-5:00PMEST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HS
October 30, 2007

SHUWANG LIU
SUPERVISORY PATENT EXAMINER